On Terms

Feedback is Not a New Principle of Behavior

Norman Peterson
Western Michigan University

The concept of feedback has assumed a significant role in recent behavior analysis literature. Its status seems to have almost become equivalent to reinforcement. There are now studies demonstrating the effectiveness of "feedback and positive reinforcement" (e.g., Runnion, Johnson, & McWhorter, 1978). In other studies, a feedback procedure is used, and the results surprisingly indicate that it was effective (Salzberg, Wheeler, Devan, & Hopkins, 1971). Feedback procedures are common independent variables in articles appearing in both the *Journal of Applied Behavior Analysis* and the *Journal of Organizational Behavior Management.* The specific types of operations subsumed under the term "feedback" are numerous and varied, as noted by Ford (1980). These include individual versus group, private versus public, personal versus mechanical, immediate versus delayed, and the schedule of feedback. Another variation, not mentioned by Ford, is providing feedback cumulatively or giving each measure of performance independently.

In some cases, feedback is treated as if it were a principle of behavior similar to reinforcement (Milby, Willcutt, Hawk, MacDonald, & Whitfield, 1973); in other cases, it is treated as a class of stimuli. In the latter case there is a controversy about whether feedback is best described as a discriminative stimulus or reinforcement (Krumhus & Malott, 1980). The question about which function it serves or even whether it serves a dual function is inappropriate. Feedback, or information about past performance, can potentially serve any of a number of behavioral functions. It is, first and foremost, a physical stimulus, irrespective of which form it takes, and therefore could have some or all of the possible behavioral effects of any stimulus. Given the proper history of conditioning, it could be a conditioned reinforcer, a conditioned punisher, a discriminative stimulus, a conditioned stimulus in a respondent paradigm, or an establishing stimulus (Michael, 1982). Even when feedback has been shown to be effective, there is seldom an analysis of why it was effective in terms of basic principles of behavior. Feedback does work (sometimes), but why it works is not at all clear in many cases, and, yet typically no behavior analysis is presented.

In many cases the delay between the relevant response and the presentation of feedback (either as antecedent or consequence) is far too great to be explained simply as a discriminative stimulus or a conditioned reinforcer (the most common explanations, when one is offered). For example, Hayes and Cone (1977) report that feedback was moderately effective at reducing residential electrical energy use. Feedback consisted of a daily "flyer" with several types of information including the amount, in dollars and cents, of electricity used the previous day, the amount for the week so far, the amount that would be consumed for the week, and the percentage above or below baseline. The effectiveness of the feedback was not analyzed in terms of either reinforcement or as a discriminative stimulus. The flyer arrived the day after the relevant responses occurred and also was presumably not present immediately before each of the responses made the next day that resulted in lower energy consumption, making it difficult to build a case for either simple reinforcement or discriminative stimulus control. Receiving the feedback was not contingent upon either higher or lower rates of consumption, although the numbers did change and presumably higher numbers had potential effectiveness as punishment and low numbers as reinforcement. It is likely

that verbal mediation would explain the temporal gaps. It is probably the case that many examples of feedback, especially when provided on an infrequent basis, can be explained in terms of rule-governed behavior rather than contingency-shaped behavior (Skinner, 1969). It is beyond the scope of this article to elaborate on this issue.

The term has its origin in cybernetics (Weiner, 1956) or control system engineering. It is closely linked to information theory, which causes a further problem by encouraging explanations of its effectiveness in cognitive or mentalistic terms. The use of the term in many human situations seems quite metaphorical and often provides little description of what variables were actually manipulated. In some instances, feedback is a synonym for praise (Miller & Sloane, 1976) and in others it seems equivalent to instructions. If we tell someone, "I can't hear you; speak more loudly," it is an instruction.

The trend in early applied behavior analysis research was to specifically describe the independent variable: for example: "The Use of Teacher Attention on Study Behavior" (Hall, Lund, & Jackson, 1968). To use feedback in the title (e.g., "The Use of Feedback to . . .) tells little about the nature of the independent variable. Better titles are: "The use of video-tape replays to improve interviewing skills" or "Graphing performance data to increase productivity."

In summary, procedures labeled feedback can be explained by operant principles and need a behavioral analysis to determine why they are effective. Such an analysis would also help design "feedback" to be maximally effective. Presumably various aspects of information about performance could be manipulated to have several behavioral effects, leading to more powerful changes in behavior. Indeed, rules could be developed telling behavioral technicians how to establish "feedback" as an effective conditioned reinforcer, or a discriminative stimulus, or an establishing stimulus. Much ambiguity would be eliminated if behavior analysts no longer used the term "feedback." It is not a new principle of behavior and it does not refer to a specific procedure; it at best has simply become professional slang.

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